Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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VV-ECMO usage in ARDS due to COVID-19: Clinical, practical and ethical considerations

To the Editor:

We write regarding the use of veno-venous extracorporeal membrane oxygenation (VV-ECMO) in the management of acute respiratory distress syndrome (ARDS) due to the virus SARS-CoV-2 and the clinical disease Covid-19. In ARDS management, VV-ECMO enhances gas exchange and may mitigate ventilator-induced lung injury. Although randomized controlled-trials [1,2] and retrospective studies [3] have failed to show a clear mortality benefit for VV-ECMO use in ARDS, they are reassuring against inferior mortality outcomes, and suggest possible clinical and mortality advantage.

Data are limited regarding VV-ECMO for Covid-19 ARDS, and this area is ripe for further research. This lack of published data may reflect the acuity of the current crisis as well as staff and supply shortages at VV-EMCO centers caring for large numbers of Covid-19 patients [4]. In these settings, the use of a resource-intensive therapy such as VV-ECMO may be viewed as ethically unjustifiable or logistically unfeasible. However, if adequate resources are available to contemplate VV-ECMO therapy for Covid-19 patients, several unique considerations apply.

Appropriate patient selection is of cardinal importance in the setting of Covid-19-resource allocations. Institutions capable of VV-ECMO must carefully allocate scarce VV-ECMO resources to non-Covid-19 and Covid-19 patients alike. Recently, Emmanuel and colleagues [4] suggested an ethical framework for rationing care in the current pandemic: benefits must be maximized, patients must be treated equally, and patients with the greatest need (the “worst off”) should be prioritized. If patients are otherwise equal candidates for a scarce resource, preference may be given to those who provide a relevant benefit to others (e.g. healthcare workers) [4]. These and similar principles [5] must be considered by any center contemplating VV-ECMO in the setting of acutely strained healthcare resources due to this current pandemic.

VV-ECMO should be reserved for patients for whom the potential benefits outweigh the associated risks (including hemorrhagic, ischemic and infectious complications), and for whom a meaningful recovery from Covid-19 is a possibility. Providers must undertake rigorous evaluations to prevent a “bridge to nowhere” situation. When candidate patients exceed VV-ECMO resources, as could occur during a Covid-19 “surge,” criteria for discontinuation of therapy must be delineated prior to cannulation. Goals of care conversations, including proactive discussions of possible treatment failure, are essential. Ethics committees and palliative care services should be deployed for particularly challenging cases.

Finally, staff must be ensured adequate personal protective equipment (PPE) when caring for VV-ECMO patients with Covid-19. This warrants particular mention due to the relatively large, multidisciplinary teams involved in high-quality ECMO care, and the volume of PPE that required in the setting of overall shortages. Inter-center transfer of VV-ECMO patients with Covid-19 may also present specific challenges regarding transmission risk [5]. Personnel, equipment, facilities, and intra- and inter-hospital systems may require reorganization to maximize effective patient care and staff safety [5].

It is likely that Covid-19 will remain the salient cause of ARDS for the foreseeable future. As the resources necessary to manage COVID-19 become relatively more abundant – both due to decreased case incidence and the increased availability of specialized healthcare equipment and staff – escalation of care to include VV-ECMO will become increasingly feasible and may be commonplace. We believe that the clinical, practical and ethical considerations presented here will useful in those circumstances.

Declaration of competing interest

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